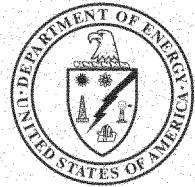


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U.S. Department of Energy
Idaho Operations Office

Waste Area Group 10, Operable Unit 10-08, Remedial Investigation/Feasibility Study Work Plan (FINAL)



Idaho National Engineering and Environmental Laboratory

**Waste Area Group 10, Operable Unit 10-08 Remedial
Investigation/Feasibility Study Work Plan
(FINAL)**

August 2002

Prepared for the
U.S. Department of Energy
Idaho Operations Office

ABSTRACT

Under the Federal Facility Agreement and Consent Order (FFA/CO) process, Operable Unit (OU) 10-08 is responsible for determining the nature and extent of contamination and potential risks to human health and the environment from the Snake River Plain aquifer resulting from 50 years of Idaho National Engineering and Environmental Laboratory (INEEL) operations. These operations introduced radioactive and hazardous contaminants into the environment and a number of these contaminants have been found or may be found in the Snake River Plain aquifer beneath the INEEL.

The scope of the OU 10-08 remedial investigation includes comprehensive investigation and characterization activities to fill the data gaps identified in the OU 10-08 modeling and the work plan, obtain adequate data to prepare the OU 10-08 Remedial Investigation/Feasibility Study (RI/FS) and subsequently the OU 10-08 Record of Decision (ROD). The risk assessment modeling done by other Waste Area Group (WAGs) will not be duplicated; instead only impacts from contaminant plumes commingling from each WAG will be evaluated.

WAG 10 includes miscellaneous surface sites and liquid disposal areas throughout the INEEL that are not included within other WAGs. WAG 10, OU 10-08 also includes regional Snake River Plain aquifer concerns related to INEEL that cannot be addressed on a WAG-specific basis. The boundary of WAG 10 is the INEEL boundary, or beyond as necessary to encompass real or potential impact from INEEL activities, and any areas within the INEEL not covered by other WAGs. Information from the OU 10-08 investigation will be used to help develop a baseline of groundwater information that will be used for institutional control and monitoring of the INEEL at least until the year 2095 (i.e., 100 years from the date of INEEL land-use projections).

This OU 10-08 RI/FS Work Plan, together with information from previous groundwater investigations conducted at the INEEL, will be used to:

- (1) Guide the evaluation of INEEL sitewide groundwater concerns,
- (2) Establish the means to evaluate, assess, and address new sites that are discovered:
 - (a) During development of the OU 10-08 ROD, and
 - (b) After the OU 10-08 ROD has been finalized.

The baseline risk assessment that will be performed as part of the Remedial Investigation/Baseline Risk Assessment (RI/BRA) will not be an

archetypical INEEL risk assessment. It will be modified using Maximum Contaminant Levels (MCLs), negotiated levels when MCLs are not available, or risk-based levels when contaminant plumes have commingled.

Based on current information, it is probable the RI/BRA results for OU 10-08 groundwater will indicate no action with monitoring will satisfy threshold criteria. Therefore, the FS evaluation for groundwater will define a monitoring program, prescribe conditions when action to remediate groundwater will be evaluated and undertaken (i.e., when it is predicted groundwater contamination may exceed MCLs or other acceptable risk-based criteria), and estimate cost for the monitoring and assessment program.

For new OU 10-08 potential release sites, it is anticipated remedial action will be consistent with similar sites previously evaluated in a feasibility study by another INEEL WAG. The FS will summarize technology processes and approaches applied to date as examples of remedial actions that will be considered when new surface sites are discovered. Cost estimates will be based on assumptions used in previous feasibility studies or on actual remediation costs incurred to implement selected remedies at other WAGs. If a new OU 10-08 site is discovered that is unlike previously evaluated sites, a site-specific assessment will be performed.

This document is divided into two main sections: The work plan and the appendix. The work plan describes the regulatory history and physical setting of OU 10-08, previous investigations and data and planned efforts to fill identified data gaps. It also describes the modeling strategy, preliminary remedial action objectives, and preliminary applicable or relevant and appropriate requirements. In addition, it discusses data gaps and data quality objectives for investigation activities, identified tasks for the RI/FS and proposes a working schedule of RI/FS activities. The waste management plan is included as Appendix A.

Attached to this Work Plan are the following supporting documents: the OU 10-08 Groundwater Modeling Strategy and Conceptual Model, the Variability of the Aquifer Thickness Beneath the Idaho National Engineering and Environmental Laboratory (INEEL), the New OU 10-08 Well Implementation Prioritization Plan, the OU 10-08 RI/FS Field Sampling Plan (FSP), and the OU 10-08 Health and Safety Plan (HASP).

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OU 10-08 Groundwater Modeling Strategy and Conceptual Model

Variability of the Aquifer Thickness Beneath the Idaho National Engineering and Environmental Laboratory (INEEL)

OU 10-08 Well Implementation Prioritization Plan

OU 10-08 RI/FS Field Sampling Plan (FSP)

OU 10-08 Health and Safety Plan (HASP)

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ACRONYMS

AEC	U.S. Atomic Energy Commission
ANL	Argonne National Laboratory
ANL-W	Argonne National Laboratory-West
ARA	Auxiliary Reactor Area
ARAR	applicable or relevant and appropriate requirement
BBWI	Bechtel BWXT Idaho, LLC
BLM	Bureau of Land Management
BORAX	Boiling Water Reactor Experiment
BRA	baseline risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
COC	contaminant of concern
COPC	contaminant of potential concern
CSA	CERCLA storage area
D&D&D	deactivation, decontamination, and decommissioning
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DQO	data quality objective
DS	decision statement
EBR	Experimental Breeder Reactor
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ERIS	Environmental Restoration Information System
FFA/CO	Federal Facility Agreement and Consent Order

FR	Federal Register
FS	feasibility study
FSP	field sampling plan
GWTF	Ground Water Treatment Facility
HASP	health and safety plan
HDR	Hydrologic Data Repository
HTRE	Heat Transfer Reactor Experiment
HQ	hazard quotient
HWD	hazardous waste determination
ICDF	INEEL CERCLA Disposal Facility
ICPP	Idaho Chemical Processing Plant
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDHW	Idaho Department of Health and Welfare
IEDMS	Integrated Environmental Data Management System
INEEL	Idaho National Engineering and Environmental Laboratory
INEL	Idaho National Engineering Laboratory
INPS	Idaho Native Plant Society
INTEC	Idaho Nuclear Technology and Engineering Center
LDRD	Laboratory Directed Research and Development
LMITCO	Lockheed Martin Idaho Technologies Company
LOFT	Loss of Fluid Test Facility
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MCP	management control procedure
NCP	National Oil and Hazardous Substances Pollution Contingency Plan

NERP	National Environmental Research Park
NIOSH	National Institute for Occupational Safety and Health
NOAA	National Oceanic and Atmospheric Administration
NOTF	Naval Ordnance Test Facility
NPL	National Priority List
NRF	Naval Reactors Facility
NRTS	National Reactor Testing Station
NSI	New Site Identification
NSIF	New Site Identification Form
OSHA	Occupational Safety and Health Act
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PBF	Power Burst Facility
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PQL	practical quantitation limit
PRG	preliminary remediation goal
PWTF	Portable Water Treatment Facility
PSQ	principal study question
PWTF	Portable Water Treatment Facility
QAPjP	quality assurance project plan
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RESL	Radiological and Environmental Sciences Laboratory
RI	remedial investigation
RI/BRA	remedial investigation/baseline risk assessment

RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RPM	Remedial Project Manager or Responsible Program Manager
RRWAC	Reusable Property, Recyclable Materials, and Waste Acceptance Criteria
RWMC	Radioactive Waste Management Complex
SAM	Sample and Analysis Management
SAP	sampling and analysis plan
SARA	Superfund Amendments and Reauthorization Act
SDA	Subsurface Disposal Area
SLERA	Screening-Level Ecological Risk Assessment
SMC	Specific Manufacturing Capability
SOP	standard operating procedure
SOW	Scope of Work
SRP	Snake River Plain
SVOC	semivolatile organic compound
TAN	Test Area North
TBC	to be considered
TPH	total petroleum hydrocarbon
TPR	technical procedure
TRA	Test Reactor Area
TSCA	Toxic Substances Control Act
TSF	Technical Services Facility
USC	U.S. Code
USCG	United States Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

USGS	United States Geological Survey
UXO	unexploded ordnance
VOC	volatile organic compound
WAC	waste acceptance criteria
WAG	waste area group
WRRTF	Water Reactor Research Test Facility

Waste Area Group 10, Operable Unit 10-08, Remedial Investigation/Feasibility Study Work Plan (FINAL)

1. INTRODUCTION

The purpose of Waste Area Group (WAG) 10, Operable Unit (OU) 10-08 is the comprehensive evaluation of impacts from 50 years of operation to the groundwater. Over the past 50 years, Idaho National Engineering and Environmental Laboratory (INEEL) operations have introduced radioactive and hazardous contaminants into the environment. A number of these contaminants have been found or may be found in the Snake River Plain aquifer beneath the INEEL. The potential impacts to the groundwater from activities conducted at the INEEL will be thoroughly investigated as part of the OU 10-08 Remedial Investigation/Feasibility Study (RI/FS).

This work plan presents the planned program for the development of the RI/FS for WAG 10, OU 10-08 at the INEEL.

The tasks outlined in this work plan will not follow the normal timeframe allocated for these activities as outlined in the Federal Facility Agreement and Consent Order (FFA/CO). Because the INEEL Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) strategy has been to make the OU 10-08 ROD the final decision document to be prepared under the terms of the FFA/CO and the Pit 9 dispute resolution has deferred the date for the OU 7-13/14 ROD signature to December 2006, the OU 10-08 enforceable milestones have been deferred once again until completion of the OU 7-13/14 ROD. Under the current agreement letters between the Department of Energy (DOE), United States Environmental Protection Agency (USEPA), and the Idaho Department of Environmental Quality (IDEQ) (DOE letter correspondence, July 3, 2002) the current plan is to defer the completion of the OU 10-08 RI/FS and ROD until after the signature of the OU 7-13/14 Record of Decision (ROD). However, since WAG 10 OU 10-08 does not control the date when the OU 7-13/14 ROD is signed, the dates specified in these letters may be different than those stated. The milestone dates presented in this letter are both expressed in terms of date and the month after signature of the OU 7-13/14 ROD:

1. 15 months – Submit Draft OU 10-08 RI/FS Work Plan to IDEQ and EPA
2. 24 months – Submit Draft OU 10-08 RI/FS ROD to IDEQ and EPA.

According to the response letter from the USEPA (July 22, 2002), the USEPA described the new deadline date for the submittal to the Agencies of the Draft RI/FS work plan would be March 2008. The submittal of the OU 10-08 Draft ROD to the Agencies would be December 2008. Due to this extended schedule, the intervening field seasons will provide the critical data needed to support and develop the RI/FS. Some of the overall tasks identified as important to the long-term sitewide groundwater monitoring for OU 10-08, such as the development of a sitewide groundwater monitoring plan, may be delayed until after the signature of the OU 10-08 ROD.

The establishment of OU 10-08 resulted from a decision by the agencies during the preparation of the WAG-10, OU 10-04 Work Plan to divide the OU 10-04 work into two different operable units because of delays in the schedules for other WAGs, namely WAG-3, OU 3-14 and WAG-7, OU 7-13/14. Data needed to help ensure that the groundwater assessments were complete and accurate were not available for inclusion in the OU 10-04 Comprehensive RI/FS. Therefore, OU 10-04 was divided into two parts and OU 10-08 is a result of this decision.

This work plan is being completed to comply with the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991) which requires evaluation of the INEEL under the “Comprehensive Environmental Response, Compensation and Liability Act” (42 United States Code [USC] § 9601 et seq.).

As stated above, the original WAG 10, OU 10-04 was divided into two parts, OUs 10-04 and 10-08. The OU 10-08 RI/FS work plan described herein will include the evaluation of sitewide groundwater concerns and an evaluation of new sites that are passed to WAG 10 by other WAGs, and sites discovered after the OU 10-04 work plan was signed. Based on the following assumptions, a standard RI/FS process for OU 10-08 will not be followed:

- The individual groundwater operable units in the other WAGs have or will perform risk assessment calculations for groundwater.
- OU 10-08 assumes that remedial actions performed under RODs for other operable units will successfully remediate the groundwater to acceptable levels of risk. The individual WAGs will remediate the groundwater plumes attributed to each WAG. WAG 10 will evaluate the potential overlap of the plumes for cumulative risk assessment and comparison to Maximum Contaminant Level (MCLs) or other acceptable risk-based concentrations, where appropriate.

Based on current information, it is anticipated the RI/BRA results for OU 10-08 groundwater will indicate no action with monitoring will satisfy threshold criteria. Therefore, it is anticipated that the FS evaluation for groundwater will define a monitoring program, prescribe conditions when action to remediate groundwater will be evaluated and undertaken (i.e., when it is predicted groundwater contamination may exceed MCLs or other acceptable risk-based criteria), and estimate costs for the monitoring and assessment program.

For OU 10-08 surface sites, it is anticipated remedial action will be consistent with similar sites previously evaluated by the other INEEL WAGs. The FS will summarize the technology processes and approaches applied to date as examples of remedial actions that will be considered when new surface sites are discovered. Estimates of costs will be provided based on previous remediation costs. If a new OU 10-08 site is discovered that is unlike previously evaluated sites, a site-specific assessment will be performed.

Therefore, OU 10-08 will monitor the groundwater for compliance with the Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) or other acceptable risk-based concentrations everywhere beneath the INEEL or downgradient from the INEEL, as necessary. For the purpose of this work plan, OU 10-08 will concentrate the monitoring efforts on the current downgradient boundary and perimeter groundwater conditions for compliance with MCLs or other acceptable risk-based concentrations. Future groundwater compliance monitoring will incorporate wells within the interior of the INEEL. These additional wells will be identified during the RI/FS process.

The OU 10-08 RI/FS will also develop a mechanism to address new sites that are identified after the OU 10-08 ROD is signed. The mechanism will establish the means to evaluate, assess, and address new sites that are discovered:

- During development of the OU 10-08 Record of Decision, and
- After the OU 10-08 ROD has been finalized.

This WAG 10, OU 10-08 work plan also includes identifying long-term sitewide groundwater monitoring needs, supporting the INEEL sitewide groundwater modeling efforts, and preparation of groundwater elevation and analytical data.

The overall objectives of the WAG 10, OU 10-08 RI/FS are to:

- Develop the INEEL sitewide groundwater conceptual model.
- Evaluate groundwater sampling results for compliance with established MCLs or other acceptable risk-based concentrations.
- Update the WAG 10 OU 10-08 regional groundwater flow model, perform model calibration, analyze existing sitewide groundwater data to evaluate background and the size, shape, and constituents of concern of plumes, and collect critical additional groundwater data.
- Establish the data and information basis for preparing the OU 10-08 RI/FS report and subsequent Record of Decision.
- Identify the long-term sitewide groundwater monitoring needs that will lead to the development of a post-ROD groundwater monitoring plan.
- Support the development of a sitewide subregional advective groundwater flow model to evaluate the potential for offsite contamination to migrate into and across the site. If the migration of offsite contamination (such as nitrate from agricultural areas) onto the INEEL appears to be significant, a recommendation for further analysis will be presented for agency approval.
- Analyze historic and current groundwater sampling data to identify the contaminants of potential concern (COPC) list, sampling frequency, and vertical profile needs for post-ROD monitoring. The basis for the WAG 10 sitewide COPC list is the COPCs identified in the RODs of individual WAGs and also analytes added to the list by Agency request.
- Develop the mechanism to address remedy selection for sites identified post-RI/FS. The mechanism will be based upon previous selected remedies of surface sites, including Track 1 decisions for no further action. Additional actions and remedy selection will be on a site-specific basis and may include documentation of actions taken on new sites by an Explanation of Significant Differences (ESDs) but all possible mechanisms to deal with the new sites will be considered. Evaluate new OU 10-08 surface sites using the new mechanism developed in the RI/FS using the Track1/Track2 process and determine appropriate remedial actions, if any.
- Monitor for compliance with MCLs and cumulative risk thresholds in the groundwater from INEEL-released contaminants whether onsite or offsite by 2095. Additional groundwater monitoring, additional groundwater monitoring wells, deep vertical profile wells, and evaluation of existing and new groundwater sampling data will be utilized to evaluate the location and movement of potential and known contaminants upgradient from, at, or downgradient from the INEEL boundary. If an INEEL-contributed groundwater plume not attributable to any individual WAG was found to exceed MCLs or other acceptable risk-based concentrations and was determined to be migrating offsite, the extent of that plume, and the impacts on any potential receptors would also have to be examined.

1.1 Site Background and Regulatory History

The INEEL is a government-owned reservation managed by the U.S. Department of Energy (DOE). The eastern boundary of the INEEL is located 51 km (32 mi) west of Idaho Falls, Idaho (Figure 1-1). The INEEL Site occupies approximately 2,305 km² (890 mi²) of the northern portion of the eastern Snake River Plain (SRP). The INEEL Site is nearly 63 km (39 mi) long from north to south and about 58 km (36 mi) in its broadest southern portion. The INEEL includes portions of Bingham, Bonneville, Butte, Clark, and Jefferson counties (DOE-ID 1997). Figure 1-2 is a map of the INEEL that identifies some of its major facilities. The WAG 10 is not labeled on Figure 1-2 because it comprises the entire area within the INEEL boundary not included in the other WAGs.

1.1.1 History of the Idaho National Engineering and Environmental Laboratory

During World War II, the U.S. Navy and Army used a large portion of the area that is now the INEEL as gunnery and bombing ranges. In 1949, the U.S. Atomic Energy Commission (AEC) established the National Reactor Testing Station (NRTS) on the Site. The NRTS was renamed twice: first as the Idaho National Engineering Laboratory (INEL) in 1974, and then as the INEEL in 1997 (DOE-ID 1997). The U.S. Bureau of Land Management (BLM) controlled the land, primarily as rangeland, before the NRTS was established. Public land/orders in 1946, 1949, and 1950, withdrew the land from the public domain. Since 1957, approximately 699 km² (270 mi²) of the INEEL, excluded from public access, have been relatively undisturbed. Currently, between 1,217 and 1,425 km² (470 and 550 mi²) are open to grazing through BLM administered permits. In 1997, the DOE established the INEEL as a National Environmental Research Park (NERP), which is one of only two such parks in the United States that allow comparative ecological studies in sagebrush-steppe ecosystems (DOE-ID 1997).

1.1.2 Regulatory History

On July 14, 1989, the EPA proposed placing the INEEL on the National Priorities List (NPL) of the *National Oil and Hazardous Substances Contingency Plan* (NCP) (40 Code of Federal Regulations [CFR] 300). The EPA Region 10 (with public participation during a 60-day comment period following the proposed listing) issued a final rule on November 21, 1989, that listed the INEEL on the NPL (54 Federal Register [FR] 48184). As a federal facility, the INEEL is eligible for the NPL pursuant to NCP requirements in 40 CFR 300.66(c)(2).

The FFA/CO (DOE-ID 1991) establishes the procedural framework and schedule for response actions at the INEEL in accordance with the CERCLA, the Resource Conservation and Recovery Act of 1980 (RCRA) (42 USC 690 et seq.), and the *Idaho Hazardous Waste Management Act* (Idaho Code 39-4401 et seq.). The FFA/CO, signed by DOE-ID, EPA Region X, and the State of Idaho, identifies 10 WAGs at the INEEL (refer to Figure 1-2).

The FFA/CO defines WAG 10 as the INEEL boundary or beyond, as necessary, to encompass any real or potential impact from INEEL activities and any areas within the INEEL not covered by other WAGs (DOE-ID 1991). Waste Area Group 10 encompasses a large area and much of that area is uncontaminated. Along with the Big Southern Butte (Figure 1-2), the WAG 10 area is also defined as the INEEL boundary minus WAGs 1 through 5, 7 through 9, and the Jefferson County landfill (58 FR 249). The OU 10-08 encompasses surface sites presently transferred from other operable units, new sites which may be identified post OU 10-08 ROD, and sitewide groundwater for those sites with completed RODs.

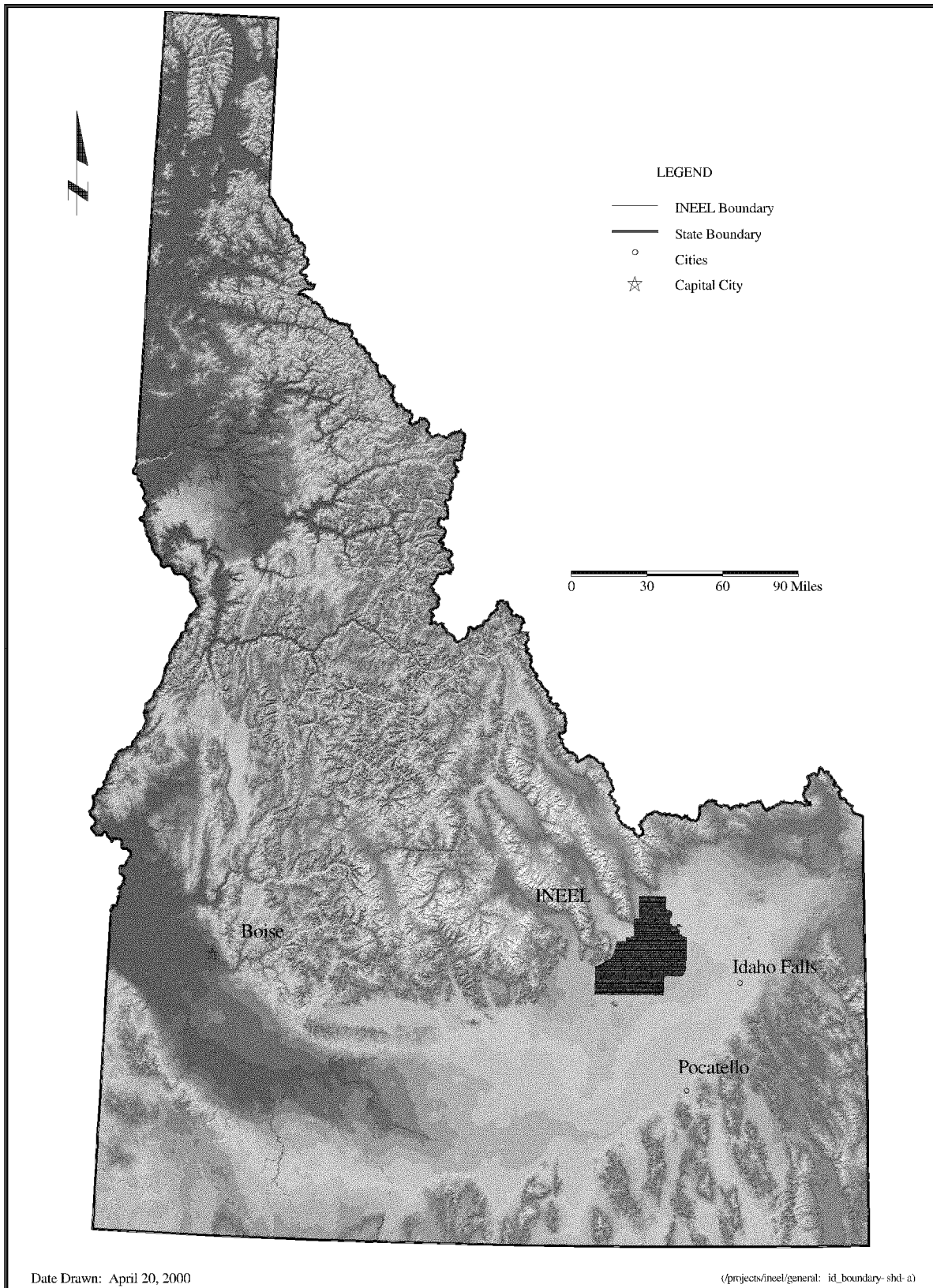


Figure 1-1. The INEEL Site vicinity map.

Idaho National Engineering and Environmental Laboratory

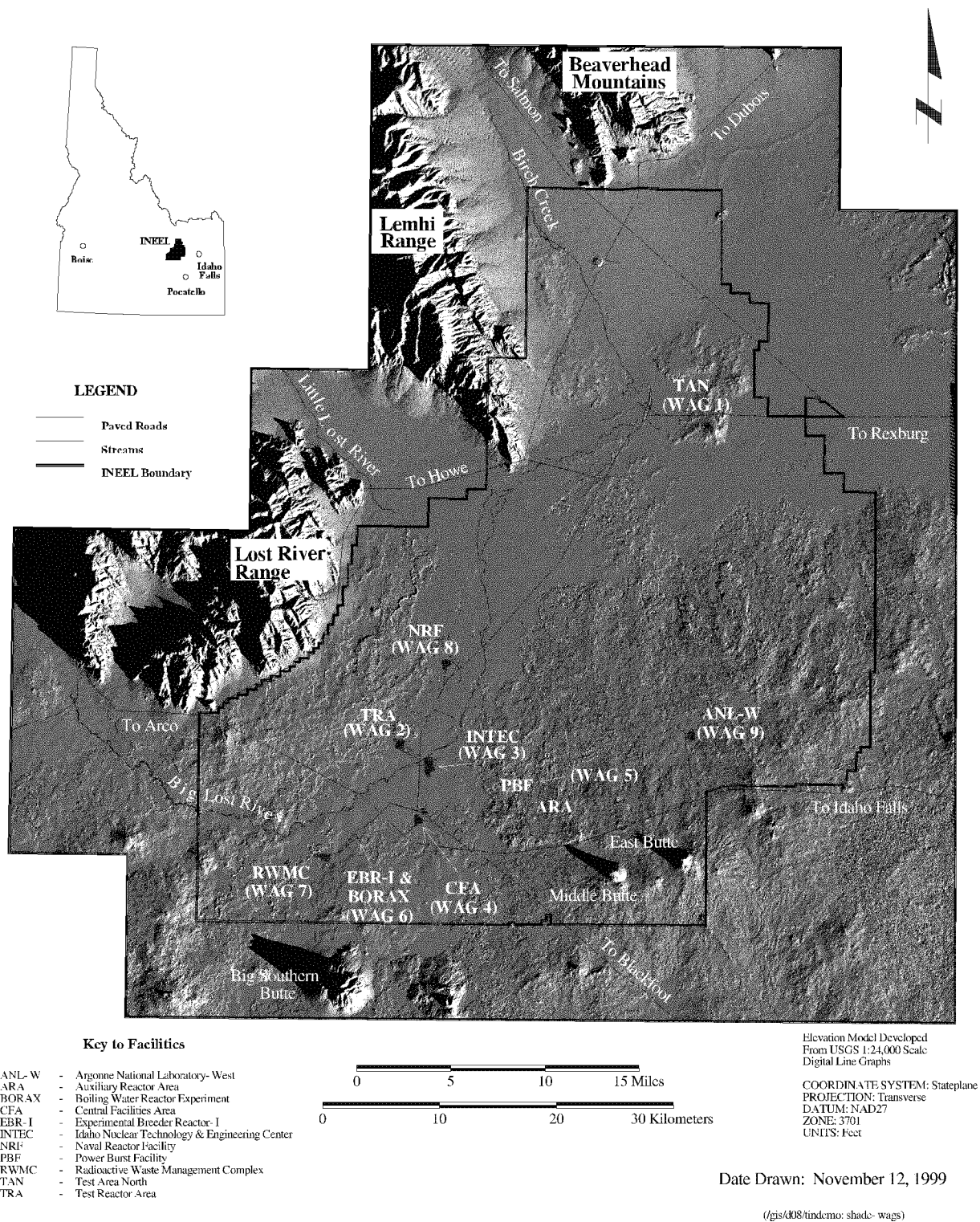


Figure 1-2. Location of INEEL facilities and general area of WAG 10 sites.

1.2 Work Plan Organization

This work plan is designed as a handbook for implementing the WAG 10, OU 10-08 RI/FS activities. The following bullets briefly describe the sections and appendix of this work plan:

- Section 1 introduces the work plan overview, describes the overall Site history, the regulatory background, and describes the work plan organization.
- Section 2 outlines the WAG 10, OU 10-08 RI/FS scope. In this section, the scope is identified and discussed including:
 - Project Plan and Scope
 - OU 10-08 Remedial Investigation/Feasibility Study Work Plan
 - Field Sampling Plan and Quality Assurance Project Plan
 - Health and Safety Plan
 - Community Relations
 - Field Activities
 - Data Evaluation
 - Remedial Investigation Report
 - Remedial Alternatives Screening
 - Detailed Analysis of Alternatives
 - Remedial Investigation/Feasibility Study Report
 - Proposed Plan and Record of Decision
 - Development of the mechanism to handle new sites that are transferred to WAG 10 post-ROD.
- Section 3 describes the project management plan which defines project organizational relationships and responsibilities, documentation requirements, and financial and project tracking requirements.
- Section 4 summarizes the Site background and physical setting. Specific discussions address physiography, geology and hydrology/hydrogeology. Sections on meteorology, INEEL soils, ecology, and demography and land use are included.
- Section 5 presents a summary of the initial evaluation of the OU 10-08 new sites and groundwater, and the preliminary applicable or relevant and appropriate requirements (ARARs) and remedial action objectives (RAOs).

- Section 6 describes the rationale for this work plan. Data quality objectives (DQOs) are discussed, specific data gaps are identified, and the methodology to fill data gaps is given. RI/FS tasks that will be conducted are identified and discussed.
- Section 7 contains the schedule for completion of the OU 10-08 RI/FS.
- Appendix A, “Waste Management Plan,” discusses the requirements for the management and disposal of waste generated during sitewide groundwater activities performed under WAG 10.

1.3 References

- 40 CFR 300, Title 40, “Protection of Environment,” Chapter 1, “Environmental Protection Agency,” Part 300, National Oil and Hazardous Substance Pollution Plan, *Code of Federal Regulations*, Current issue.
- 54 FR 48184, 40 CFR 300, “Environmental Protection Agency National Priorities List of Uncontrolled Hazardous Waste Sites,” *Code of Federal Regulations*, Final Rule.
- 58 FR 249, 40 CFR 300, “Environmental Protection Agency National Priorities List of Uncontrolled Hazardous Waste Sites,” *Code of Federal Regulations*, Final Rule.
- 42 USC § 6901 et seq., 1980, “Resource Conservation and Recovery Act,” *United States Code*.
- 42 USC § 9601 et seq., December 11, 1980, “Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA/Superfund) of 1980,” *United States Code*.
- DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, 1088-06-29-120, U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency, Region 10; State of Idaho, Department of Health and Welfare.
- DOE-ID, 1997, *Scope of Work for Operable Unit 10-04 WAGs 6 and 10 Comprehensive Remedial Investigation/Feasibility Study*, DOE/ID-10553, March 1997.
- Idaho Code 39-4401, *Hazardous Waste Management Act of 1983*, Title 39, “Health and Safety,” Chapter 44, “Hazardous Waste Management.”

2. REMEDIAL INVESTIGATION/FEASIBILITY STUDY TASKS

The Waste Area Group (WAG) 10, Operable Unit (OU) 10-08 Remedial Investigation (RI) will include a variety of tasks related to scoping, implementation, and decision making under the Federal Facility Agreement/Consent Order (FFA/CO). Standard remedial investigation/feasibility study (RI/FS) tasks have been identified by the Environmental Protection Agency (EPA), *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988), to provide consistent reporting and to allow more effective monitoring of RI/FS projects. Discussed below are the proposed activities in each task that will lead to the OU 10-08 RI/FS. Summaries of the RI tasks are described in this section.

2.1 Project Plan and Scope

The project planning and scoping tasks, of which this work plan is a part, involve activities necessary to initiate the OU 10-08 RI/FS. Project planning identifies the sequence of site activities required to complete the investigation. The following subsections describe the plans developed as part of the planning and scoping process. These plans are prepared in accordance with the EPA document titled, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988).

2.1.1 OU 10-08 Remedial Investigation/Feasibility Study Plan

This plan presents the initial evaluation and summary of existing data and information gathered in the scoping process. It also documents decision types identified during project scoping and defines activities to be conducted in response to the identified decision types. The RI/FS work plan includes the following elements:

- A description of the Site background and physical setting
- A project description, including project management organization and responsibilities
- An evaluation of all new Track 1 sites to be evaluated in OU 10-08 RI/FS and a mechanism to evaluate new sites discovered post-ROD
- A review of groundwater data for selected remedies from other WAGs RODs to focus the OU 10-08 FS (This may have to be expanded if new sites at other WAGs are turned over to WAG 10)
- A discussion of the Data Quality Objectives (DQOs)
- A list and discussion of all tasks planned for the RI/FS
- A schedule for and description of the work tasks to be performed
- A schedule of deliverables associated with the OU 10-08 RI/FS.

2.1.2 Field Sampling Plan (FSP) and Quality Assurance Project Plan

An FSP containing the sampling objectives, the sample locations and frequency, sample designation, sampling equipment, and sample handling and analysis associated with the work plan execution has been developed and is a stand alone document attached to this work plan (Haney 2002).

The referenced Quality Assurance Project Plan (QAPjP) (DOE-ID 2000) includes procedures designed to ensure sample integrity, precision and accuracy in the analytical results, and representativeness and completeness of environmental data. The QAPjP is not an attachment to this work plan, but is available through the administrative record. The QAPjP (DOE-ID 2000), written in accordance with RI/FS guidance (EPA 1988) discusses the following elements:

- INEEL Environmental Restoration (ER) description
- Project organization and responsibility, including the names of individuals responsible for ensuring that the environmental data collected are valid
- Quality assurance objectives for data including required data precision, accuracy, representativeness, completeness, and allowed usage of the data
- Sample custody procedures and documentation
- Calibration procedures and frequency
- Analytical procedures with references to applicable standard operating procedures
- Data reduction, validation, and reporting procedures
- Internal quality control procedure description or reference
- Performance and system audits
- Preventive maintenance procedures
- Specific routine procedures used to assess data accuracy, precision, and completeness
- Corrective action procedures
- Quality assurance reports including results of system and performance audits and assessments of data accuracy, precision, and completeness.

2.1.3 Health and Safety Plan

The HASP details health and safety measures for field activities and is included as a stand-alone document attached to this work plan (Roberts 2002). The HASP discusses personal protective equipment, medical surveillance requirements, and applicable safety procedures. The HASP includes the elements described in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH/OSHA/USCG/EPA) and 29 CFR 1919.120, “Hazardous Waste Operations and Emergency Response.”

2.2 Community Relations

Community relations activities for the OU 10-08 RI/FS will be guided by the *INEEL Community Relations Plan* (current issue). This plan is a guide for public involvement and community relations in the ER program at the INEEL. It was developed to include the community in the environmental cleanup decision-making process.

Community relations activities for the OU 10-08 RI/FS, which coincide with important phases of the project, are designed to keep the public informed and involved. The following include the community relations activities and their schedules:

- A “kick-off” fact sheet will be distributed that introduces the scope of the OU 10-08 RI/FS.
- The proposed plan will be distributed to individuals on the INEEL mailing list, before the start of a 30-day public comment period. An updated fact sheet, describing RI/FS results, will be distributed before the proposed plan is submitted.
- A public meeting will be held to present the proposed plan and the FS results, and to provide the public an opportunity for discussion and comment. Opportunities for briefings, site tours, conference calls, and group discussions will be available upon request. A site tour of the INEEL areas or a briefing may be requested at anytime during the project.
- The RI/FS report, ROD, and other project documents will be available in the administrative record for public inspection as they are finalized and before finalization of the ROD. The ROD will include a responsiveness summary, in which comments submitted by the public will be addressed. Those who submit comments will receive a copy of the final ROD.

2.3 Field Activities

Data collection and data development tasks will be performed as detailed below for OU 10-08. The work plan tasks will focus on problem definition and will result in sufficient data to adequately define, evaluate, and decide on remedial action alternatives. The investigation approaches will be detailed in the FSP for OU 10-08 (Haney 2002).

2.3.1 Field Work-Related Tasks

2.3.1.1 WAG 10 OU 10-08 Waste Management. Waste generated during OU 10-08 activities will be appropriately managed under CERCLA (Appendix A). Future WAG 10, OU 10-08 CERCLA waste may include nonhazardous and nonradioactive waste, hazardous and radioactive (mixed) waste, radioactive waste, and hazardous waste. Non-hazardous, non-radioactive waste will be disposed of at on-site facilities. Hazardous, radioactive and mixed wastes may be disposed of at on-site disposal facilities and/or off-site disposal facilities (e.g., facilities operated by Envirocare or Permafrix).

2.3.1.2 Sample Collection, Analysis, and Data Validation. These tasks involve sample collection, laboratory analysis, and data validation. The methods and protocols that will be used in sampling and the analysis of samples collected for the OU 10-08 RI/FS are described in the FSP (Haney 2002). The Sample and Analysis Management (SAM) will validate the data to the levels of analytical method data validation called for in the FSP, which are defined in TPR-79, “Levels of Method Validation.” The analytical method data validation will be conducted in accordance with TPR-80, “Radiological Data Validation,” TPR-132, “Inorganic and Miscellaneous Classical Analysis Data Evaluations,” SMO-SOP-12.1.3, “Validation of Volatile Organic Gas Chromatography,” and SMO-SOP-12.1.4, “Validation of Gas Chromatographic Data.” Validated data are entered in the Integrated Environmental Data Management System (IEDMS) and uploaded to the sitewide groundwater database.

2.3.2 Data Evaluation

Data collected during this RI and historical data will be evaluated and presented in maps, tables, graphs, and figures. Data evaluation will include an assessment of accuracy, precision, completeness, comparability, and representativeness.

2.4 Remedial Investigation Report

A RI report will summarize the nature and extent of contamination at WAG 10, OU 10-08 in groundwater and at new sites. The draft RI report, a secondary document as defined in the FFA/CO Action Plan, will support the RI/FS process for new sites, which selects the appropriate remedy for mitigating risk. The RI report will be prepared in accordance with the suggested RI report format presented in EPA guidance (EPA 1988).

The RI report will be revised after written comments on the draft RI report have been received from the EPA and IDHW. Written comment responses will be incorporated into the final RI/FS report.

2.5 Remedial Alternatives Screening

The FS, if required for new sites, will develop, screen, and analyze remedial alternatives. A site-specific statement of purpose for a response (i.e., an evaluation of remedial alternatives through the FS process) will be prepared based on the results of the RI and the cumulative and comprehensive risk assessment. This statement will identify the actual or potential contamination sources and exposure pathways to be addressed by the remedial action alternatives.

The following sections describe how general response actions are further broken down into applicable technology types and process options, the process of alternative development using general response actions, and the screening of alternatives.

2.5.1 Remedial Action Objectives and General Response Actions

Remedial action objectives are media-specific or OU-specific goals for protecting human health and the environment. The RAOs will be based on the results of an initial analysis of ARARs, and an evaluation of compliance with groundwater MCLs or other risk-based concentrations, evaluated groundwater risks, and risks from new sites. The RAOs will focus on protecting human health and the environment and will address the need to achieve specific contaminant concentrations and/or eliminate the contaminant migration pathways.

2.5.2 Preliminary Remedial Process Options

2.5.2.1 Appropriate Process Options. The FS process will include a screening of appropriate process options available to address residual contamination that poses unacceptable risks at WAG 10. Process options may be categorized into various technology types. The process options are grouped into the general response actions given below.

- **No Action**—The general response action of No Action would be considered as a baseline against which developed alternatives would be compared.
- **Monitoring**—Monitoring can be performed to identify potential contaminant migration or other changes in site conditions that may warrant future remedial actions and can include groundwater sampling, vadose zone monitoring, air sampling, and soil surveys.

- ***Institutional Controls***—Institutional controls include actions that prevent or limit access to contaminated areas through the period of time that DOE controls the OU 10-08 site. Institutional controls also may extend beyond the period in which DOE maintains control of the site; however, another agency, such as the BLM, may take over the administration of institutional controls. Institutional controls include monitoring, administrative procedures, deed restrictions, fences or other barriers, signs, and security.
- ***Containment***—Containment, often the preferred method of dealing with sites where treatment is impractical, may reduce the risk to acceptable levels without removing contaminants from the site. Containment includes process options such as capping, grout curtains, and sheet pilings designed to isolate contaminants and prevent their migration beyond the containment boundaries. Experience and data collected from other contaminated sites will be used to guide the development and evaluation of any alternatives that include the general response action of containment.
- ***In Situ Treatment***—In situ treatment process options include treatment technologies such as biotreatment, soil flushing, vapor extraction, and vitrification. The in situ treatment options would be integrated into alternatives that focus on reducing the toxicity, mobility, or volume of contaminants without removal.
- ***Ex Situ Treatment***—Ex situ treatment process options would require removing contaminants from their current location and treating them to reduce their toxicity, mobility, or volume. Ex situ treatment options could include processes such as soil washing, thermal desorption, vitrification, and oxidation/reduction. Treated materials can either be returned to their original location or transported to a new location.
- ***Excavation or Disposal On-Site or Off-Site***—This general response action includes process options for removing contaminated media. Once removed, materials would be packaged for disposal in an engineered facility located either on-Site or off-Site, possibly after some type of ex situ treatment.

2.5.2.2 Screening of Process Options. The list of preliminary process options supporting the selected general response actions for OU 10-08 will be screened to eliminate clearly unsuitable process options. The process option screening will be based on effectiveness, implementability, and cost.

Specific process options will be evaluated for their effectiveness in achieving the RAOs. This evaluation will focus on:

- The potential effectiveness of process options in handling the estimated volumes of contaminants in specific environmental media and meeting the remediation goals identified in the RAOs
- The potential impacts to human health and the environment during the construction and implementation phase
- The reliability of the process with respect to remediation of the contaminants and site conditions.

Implementability encompasses both the technical and administrative feasibility of implementing a process option. Technical implementability is used as an initial screen of process options to eliminate those that are clearly ineffective or unworkable at a site. Administrative implementability, namely the availability of treatment, storage, and disposal services including capacity, equipment, and skilled workers, are considered during the detailed analysis of alternatives.

Cost is a factor in the screening of process options. Relative capital and operation and maintenance costs are used rather than detailed estimates. At this stage, the cost analysis is based on engineering judgment and past experience. The cost of each process is evaluated to determine whether costs are high, low, or medium compared with process options of the same technology type.

Elimination of any process option during the screening process will be fully documented in the final FS report.

2.5.3 Development of Alternatives

Alternatives will be developed that protect human health and the environment by eliminating, reducing, or controlling risks posed by the site. General response actions and the process options chosen to represent the various technology types for each medium are combined to form alternatives for WAG 10 as a whole. Often, more than one general response action will be applied to each medium.

2.5.4 Threshold and Balancing Criteria

Alternatives will be screened based on the short- and long-term aspects of their effectiveness, implementability, and cost. To the extent practicable, a wide range of alternatives will be preserved.

2.5.4.1 Effectiveness. An essential aspect of the screening evaluation is the effectiveness of each alternative in protecting human health and the environment. Each alternative developed will be evaluated for its effectiveness to provide protection and reduce toxicity, mobility, or volume. Both short- and long-term components of effectiveness will be evaluated. Short-term effectiveness refers to the period until the remedial action is complete. Long-term effectiveness refers to controls that may be required to manage the risk posed by treatment residuals, untreated water, and any contamination left at a site. Reduction of toxicity, mobility, or volume refers to changes in one or more characteristics of the radiological or chemical compounds or contaminated media resulting from a treatment that decreases the inherent threats or risks associated with the contamination.

2.5.4.2 Implementability. Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as ability to construct, operate, and maintain a remedial alternative, availability of services and materials, and ability to obtain approvals from other offices and agencies are considered.

2.5.4.3 Cost. A cost estimate for each alternative will be prepared. The estimate of capital and operations and maintenance costs will be considered, where appropriate, during the screening of alternatives. The evaluation will include those operation and maintenance costs that will be incurred for as long as necessary, even after the initial remedial action is complete. In addition, potential future remedial action costs will be considered during alternative screening to the extent that they can be defined. Present worth analyses will be used during alternative screening to evaluate expenditures that occur over different time periods.

2.5.4.4 Selection of Alternatives for Detailed Analysis. The list of candidate alternatives will be narrowed to those that reduce risk to the public and the environment and are technically feasible. The identified process options will be evaluated and screened based on effectiveness, implementability, and cost.

2.6 Detailed Analysis of Alternatives

A detailed analysis of alternatives is a range of OU 10-08 remedial alternatives that represent distinct, viable approaches to addressing residual risks at WAG 10. A No Action alternative will serve as a baseline for comparison to the action alternatives. Alternatives remaining after the screening process will be thoroughly analyzed. The detailed analysis will consist of an assessment of individual alternatives compared to the nine evaluation criteria discussed below. A comparative analysis will then focus on the relative performance of each alternative against the criteria.

The nine evaluation criteria are categorized into three groups: (1) threshold criteria, (2) primary balancing criteria, and (3) modifying criteria. The first two criteria, “Overall Protection of Human Health and the Environment” and “Compliance with ARARs,” are the threshold criteria that must be met in order for an alternative to be eligible for selection. The third through seventh criteria are the primary balancing criteria that compare the relative tradeoffs among the alternatives. The last two criteria are the modifying criteria and will be addressed in the ROD following public comment on the comprehensive RI/FS report and proposed plan.

2.6.1 Overall Protection of Human Health and the Environment

Alternatives will be assessed to determine whether they adequately protect human health and the environment by eliminating, reducing, or controlling risks.

2.6.2 Compliance with ARARs

The alternatives will be assessed to determine whether they meet federal and state ARARs.

2.6.3 Long-Term Effectiveness and Permanence

Alternatives will be assessed to determine the long-term effectiveness and permanence they afford, along with the likelihood of success of each alternative. Factors affecting long-term permanence and effectiveness include:

- The residual risk assessment for each alternative to evaluate the cumulative effects of both long-term and short-term risks associated with the implementation of the remedial alternative
- The type, degree, and adequacy of long-term management required, including engineering controls, institutional controls, monitoring, operation, and maintenance
- Long-term reliability of controls, including uncertainties associated with land disposal of untreated hazardous waste and treatment residuals
- The potential needs to provide a substitute for the remedy.

2.6.4 Reduction of Toxicity, Mobility, and Volume through Treatment

The degree to which alternatives employ treatments that reduce toxicity, mobility, and volume will be assessed, based on the following considerations:

- The type of process options employed for the alternatives and which materials they will treat
- The amount of contamination that will be destroyed or treated

- The degree of expected reduction in toxicity, mobility, and volume
- The degree to which the treatment is reversible
- Residuals that will remain and by-products that will be created following treatment.

2.6.5 Short-Term Effectiveness

Assessment of short-term effectiveness of alternatives will consider:

- Possible short-term risks to the community (e.g., workers and near-by human residents) during implementation of an alternative
- Potential impacts on workers conducting remedial actions and the effectiveness and reliability of protective measures
- Potential environmental impacts of remedial actions and the effectiveness and reliability of mitigative measures during implementation
- The time until protection is achieved.

2.6.6 Implementability

Assessment of the ease or difficulty of implementing the alternatives will be considered based on the following:

- Degree of difficulty or uncertainty associated with construction and operation of the technology
- Expected operational reliability and the ability to undertake additional action, if required
- Ability and time required to obtain necessary approvals and permits from applicable agencies
- Availability of necessary equipment and specialists
- Available capacity and location of needed treatment, storage, and disposal services
- Timing of the availability of prospective technologies that may be under development.

2.6.7 Costs

Costs will be estimated, including capital and operation and maintenance costs, based on present value. The costs will be developed with an accuracy of +50 to -30% (EPA 1988) unless otherwise stated in the FS.

2.6.8 State Acceptance

Concerns identified by the Idaho Department of Environmental Quality (IDEQ) during its review of the comprehensive RI/FS work plan, RI/FS proposal plan, and ROD will be assessed. The review will consider the proposed use of waivers, the selection process used to evaluate alternatives, and other actions. Comments received from the state will be incorporated into the remedial evaluation.

2.6.9 Community Acceptance

Community response to the alternatives will be assessed. Similar to the State's acceptance criteria, complete assessment will not be possible until comments on the proposed action have been received. The process for public involvement is discussed in Subsection 2.2.

2.7 Remedial Investigation/Feasibility Study Report

The RI/FS report will summarize the results of previous field investigations, treatability studies, ARAR analyses, previous comprehensive and cumulative risk assessments, the qualitative risk assessment performed as part of this work plan, and remedial alternatives. The RI/FS report is defined as a primary document in the action plan. The RI/FS report will serve as a basis for consolidating information and documenting the rationale used to screen and develop remedial actions associated with WAG 10, OU 10-08. The elements of the RI/FS report will follow the basic format presented in the EPA guidance (EPA 1988). Supporting data, information, and calculations will be included in the appendices to the report. The document will be revised per the comments received and submitted to DOE-ID, EPA, and Idaho Department of Environmental Quality (IDEQ) for review. Written comments on the draft RI/FS from EPA and IDEQ will be addressed in the final RI/FS report.

2.8 Proposed Plan and Record of Decision

This task includes the preparation of a proposed plan and ROD. The proposed plan, a secondary document as defined in the action plan, will be prepared to facilitate public participation in the remedy selection process. After the RI/FS report is compiled, the proposed plan for OU 10-08 will be presented to the public. The proposed plan will outline any proposed remediation plans developed and supported by the OU 10-08 RI/FS activities. The proposed plan will be written in accordance with the format recommended in EPA guidance (EPA 1988). Any issues raised during the public comment period will be addressed in the responsiveness summary of the ROD.

Public involvement in the decision process is vital to the successful implementation of a remediation alternative. Public participation in the decision process will be conducted according to the *INEEL Community Relations Plan* (current issue) and EPA guidance (EPA 1988).

After agency and public comments are resolved and the RI/FS report and proposed plan are completed, appropriate paths forward for OU 10-08 will be selected and documented in the ROD, which will be signed by the parties specified in the FFA/CO. The ROD will be prepared in accordance with EPA guidance (EPA 1988) and will serve the following four functions:

1. Certify that the remedy selection process was carried out in accordance with the FFA/CO, CERCLA, and the NCP
2. Describe the technical parameters and goals of the remedy, specifying the treatment, engineering, and institutional components
3. Provide the public with a consolidated source of information about the site and the chosen remedy, including the rationale behind the selection
4. Delineate post-ROD activities such as scoping the remediation, developing the remedial action plan, and monitoring.

2.9 Enforcement Aspects

Enforcement activities include preparation of briefing materials, meeting attendance, and task management and quality control functions.

2.10 Administrative Support

An administrative record file will be maintained for the OU 10-08 RI/FS. The administrative record is a collection of project documents required by CERCLA, in addition to other technical and legal documents and correspondence. The official administrative record is located at the INEEL Technical Library in Idaho Falls, Idaho. Copies of documents in the administrative record file are also located in information repositories in the Boise INEEL Office, and the Marshall Public Library in Pocatello. Select copies of Superfund-related documents are also located in public libraries in Idaho Falls, Twin Falls, and Boise.

2.11 References

29 CFR 1919.120, Hazardous Waste Operations and Emergency Response, *Code of Federal Regulations*.

40 CFR 300.403, 1997, Remedial Investigation/Feasibility Study and Selection of Remedy, *Code of Federal Regulations*, Office of Federal Register.

DOE-ID, 1994a, *Track 2 Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL*, DOE/ID-10389, Revision 6.

DOE-ID, 1995, *INEEL RRWAC*, DOE/ID-10381, U.S. Department of Energy Idaho Operations Office.

DOE-ID, March 1996, *Idaho National Engineering Laboratory Comprehensive Facility and Land Use Plan*, DOE/ID-10514, Department of Energy, Idaho Operations.

DOE-ID, 2000, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites*, DOE/ID-10587, Revision 6.

EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, Interim Final, EPA/540/G-89/004.

Haney, T. J., 2002, *Field Sampling Plan for Groundwater Monitoring Under Operable Unit 10-08 for 2002, 2003, and 2004*, INEEL/EXT-01-01529, March 2002.

INEEL Community Relations Plan, Current issue.

INEEL Form 0435.28, "Solid/Hazardous Waste Determination."

LMITCO, 1995, *Data Management Plan*, Lockheed Martin Idaho Technologies Company, INEL-95/0257.

LMITCO, 1996, *Waste Certification Plan for the Environmental Program*, INEL-96/0043, April.

Lockheed Martin Idaho Technologies Company, Manual-1, General Administration and Information Management, Current issue.

McCarthy, J. M., Arnett, R. C., Neupauer, R. M., Rohe, M. J., and Smith, C. S., 1994, Technical Memorandum: *Development of a Regional Groundwater Flow Model for the Area of the Idaho National Engineering Laboratory, Eastern Snake River Plain Aquifer*, EG&G Idaho, Draft published September, 1994.

MCP-557, "Managing Records."

NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.

Roberts, J. D., 2002, *Health and Safety Plan for the Environmental Restoration Long-Term Sitewide Groundwater Monitoring*, INEEL/EXT-01-01644, March 2002.

SMO-SOP-12.1.3, "Validation of Volatile Organic Gas Chromatography."

SMO-SOP-12.1.4, "Validation of Gas Chromatographic Data."

TPR-79, "Levels of Method Validation."

TPR-90, "Radiological Data Validation."

TPR-132, "Inorganic and Miscellaneous Classical Analysis Data Evaluations."

WAG 10 Groundwater Modeling Strategy and Conceptual Model, INEEL/EXT-01-00768, Rev. B.

3. PROJECT MANAGEMENT PLAN

This section describes the elements of project management for the WAG 10, OU 10-08 RI/FS. A more extensive discussion of roles and responsibilities is found in the OU 10-08 Health and Safety Plan (Roberts 2002). These elements are:

- Key positions and responsibilities
- Organization
- Change control
- Work performance
- Communications.

3.1 Key Positions and Responsibilities

3.1.1 Senior Project Manager

The senior project manager (DOE contractor) is responsible for work planning, authorization and performance, analysis, reporting, baseline change control, and for day-to-day communication with DOE-ID. These responsibilities include the following tasks.

- Preparing, issuing, reviewing, approving, and maintaining cost accounts that define work scope, scheduled milestones, and budget that comply with the management control system
- Distributing funds to project managers and work performers for authorized work
- Preparing baseline documents and implementing the management control system, including preparation of a project work breakdown structure and development of control account authorization documents
- Evaluating project performance against the baseline control account plan, presenting variance analysis and corrective action plans, and preparing monthly reports to DOE-ID
- Implementing corrective actions through preparing and approving change documents, as required
- Managing subcontracted work
- Guiding the project manager and contributing individuals.

3.1.2 Project Manager

The project manager is responsible to the senior project manager for the detailed planning and performance of work within any assigned work package. The work package manager is also responsible for the technical quality of the work performed. The project manager is responsible for the following tasks:

- Negotiating with the senior project manager about project scope, schedule, and budget

- Managing scope, schedule, and budget for work performed by organizations within Bechtel BWXT Idaho, LLC (BBWI)
- Supporting the senior project manager in integrating schedules and resources into assigned control accounts
- Reporting project status monthly and weekly
- Maintaining proper change and revision control of assigned control account
- Implementing corrective actions, when required.

If a senior project manager has not been identified, the project manager assumes the duties of the senior project manager. When the project is too small to warrant a senior project manager, the project manager assumes those duties. When the project is too small to warrant a control account manager, the project manager assumes those duties.

3.1.3 Control Account Manager

The control account manager is responsible to the summary account manager for the detailed planning and performance of work within an assigned control account. The control account manager also is responsible for the technical quality of the work. The control account manager is responsible for the following tasks:

- Negotiating with the summary account manager until agreement is reached on scope, schedule, and budget
- Developing control account plans by defining work packages in accordance with the scope, schedule, and budget provided on the cost account authorization
- Ensuring that control account plans are developed in compliance with the management control system
- Defining, planning, scheduling, and negotiating supporting work from performing organizations
- Supporting the summary account manager in integrating schedules and resources in assigned cost accounts with other cost account managers
- Providing monthly progress status on the control account plan
- Ensuring performance of the work planned on the control account plans
- Controlling changes and revisions
- Implementing corrective necessary actions, when required.

3.2 Organization

This section provides an overview of project planning, budgeting, and project baselines.

3.2.1 Planning and Budgeting Overview

Planning and budgeting are the processes by which control accounts are developed, reviewed, approved, and authorized. The sum of the approved control account plans becomes the time-phased performance measurement baseline, which is the formal plan against which progress is evaluated. This section describes the parameters for project work, including the project master schedule and the work breakdown structure. From these documents, the control account and its associated schedule, budget, and Scope of Work (SOW) are defined.

The planning process requires the full SOW to be planned and scheduled. Once scope is established, resources are applied and fully planned work and applied resources are compared to the available budget. If the available budget is insufficient for the planned work, either the budget will be increased or the scope will be decreased. The EPA and the IDEQ will be consulted should budgets dictate consideration of a change in agreed to scope.

A control account authorization is prepared using the project master schedule and the work breakdown structure as guidance. The control account authorization specifies the boundaries of each control account and is used by the senior project manager for planning the work package details. The control account plans and control account authorization are reviewed and approved by the DOE-ID counterpart, the senior project manager, and other appropriate management. Approval of the control account authorization and control account plan constitutes authority to perform work.

3.2.2 Project Baselines

The project baselines, used for evaluating project performance, are established in the project master schedule and work breakdown structure, and are further defined in the control account authorization and cost plan. The various baselines are defined as follows:

- The budget baseline for the project is the sum of the approved budgets on the control account authorizations plus undistributed budget, which are maintained through the change control system.
- The schedule baseline consists of the key decision points and major milestones displayed on the project master schedule. Key decision points and major milestones are shown in the control accounts that directly support the milestones. Key milestones are defined by either DOE headquarters or DOE-ID, and major milestones are defined by BBWI.
- The scope of baseline, or technical baseline, is defined in the work breakdown structure and detailed in the total control account authorizations. It is expanded further in the design media, operating specifications, and process flow sheets.
- The funds baseline is contained in the annual approved funding program plan. The budget authority is a ceiling for costs plus commitments, and the budget outlay is a ceiling for expenditures only during each fiscal year.

3.3 Change Control

Waste Area Group 10 OU 10-08 will use the change control process to manage and control changes to the performance measurement baseline, the schedule baseline, and the SOW. The change control process applies to all major projects and major system acquisitions and will be implemented according to the latest revision of MCP-3794, “Baseline Management.”

3.4 Work Performance

The work performance measurement process consists of retrieving planning, performance, and cost data, and providing the data to various management levels for timely decision-making corrective action. The data are used to calculate cost, schedule, and completion variances. Written variance analyses are required on an exception basis (e.g., when variances exceed predetermined thresholds) to identify causes of significant deviations from plans and to identify and implement appropriate corrective actions. The cost and schedule generated at the cost account level are summarized through both the work breakdown structure and the organization structure to provide information concerning each manager’s area of responsibility. This information is analyzed by the appropriate manager and then is summarized in written reports that document costs, schedule, and technical performance.

3.4.1 Work Performance Measurement

3.4.1.1 Senior Project Manager. The senior project manager is responsible for accomplishing the work described in the control account plan.

3.4.1.2 Management Control System Elements. Five key data elements within the management control systems are used to calculate variances that give the senior project manager an indication of the progress toward the goals and objectives stated on the cost account plan. The various performance measurements are defined as follows:

- *Budgeted Cost for Work Scheduled*—The planned value for work in a control account plan that is scheduled in a given time period.
- *Budgeted Cost for Work Performed*—The value of work actually completed during the measurement period. It is equal to the planned value for the work that was finished.
- *Actual Cost of Work Scheduled*—The actual accrued costs incurred within a given time period, including labor and material, and the associated indirect costs.
- *Budget at Completion*—The total budget authorized for a cost control account.
- *Estimated Cost at Completion*—An estimate of the sum that is the actual costs to date plus a forecast of the costs to complete the remainder of the work.

The status of the control account is determined monthly using the data elements discussed above.

3.5 Communications

The two types of reports explained in this subsection will be prepared for this project: (1) routine and (2) event reports. Each of these is discussed below.

3.5.1 Routine Reports

Weekly and monthly reports will be issued to the DOE-ID project manager. Reports will contain a summary of work in progress, planned work, problems encountered, results of any change control board or internal change board actions, work stoppages, anticipated schedule variances, work completed, key position changes, status of subcontracts, corrective action plans, audits performed, and earned value reports.

3.5.2 Event Reports

Unusual events may be within the scope of DOE Order 232.1. If such events occur, notifications will comply with this order. Unusual events outside the scope of DOE Order 232.1 will be reported as follows:

- Minor problems will be reported to the site supervisor and, if necessary, to the safety representative.
- Radiological health and safety problems that cannot be corrected onsite will be reported to the site supervisor or the health and safety officer.

3.6 References

DOE Order 232.1, Occurrence Reporting.

INEEL/EXT-01-01644, Rev. 0, Health and Safety Plan for the Environmental Restoration Long-Term Sitewide Groundwater Monitoring (Roberts 2002).

MCP-3794, "Baseline Management."